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DEFINING THE FUTURE

Network Centric Warfare

Defense Acquisition University

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Warfare Today: The Central Problems

- **The integration of massive streams of data/information…**
- **From multiple agencies and platforms…**
- **Via multiple and variable pathways…**
- **On independent and asynchronous timelines…**

Warfare **Tomorrow**

- **Securely deriving accurate and actionable knowledge and decisions from the data/information…**
- **And communicating those decisions quickly and reliably to the right units for action**

Network-Centric Warfare Vision
Single Integrated Picture

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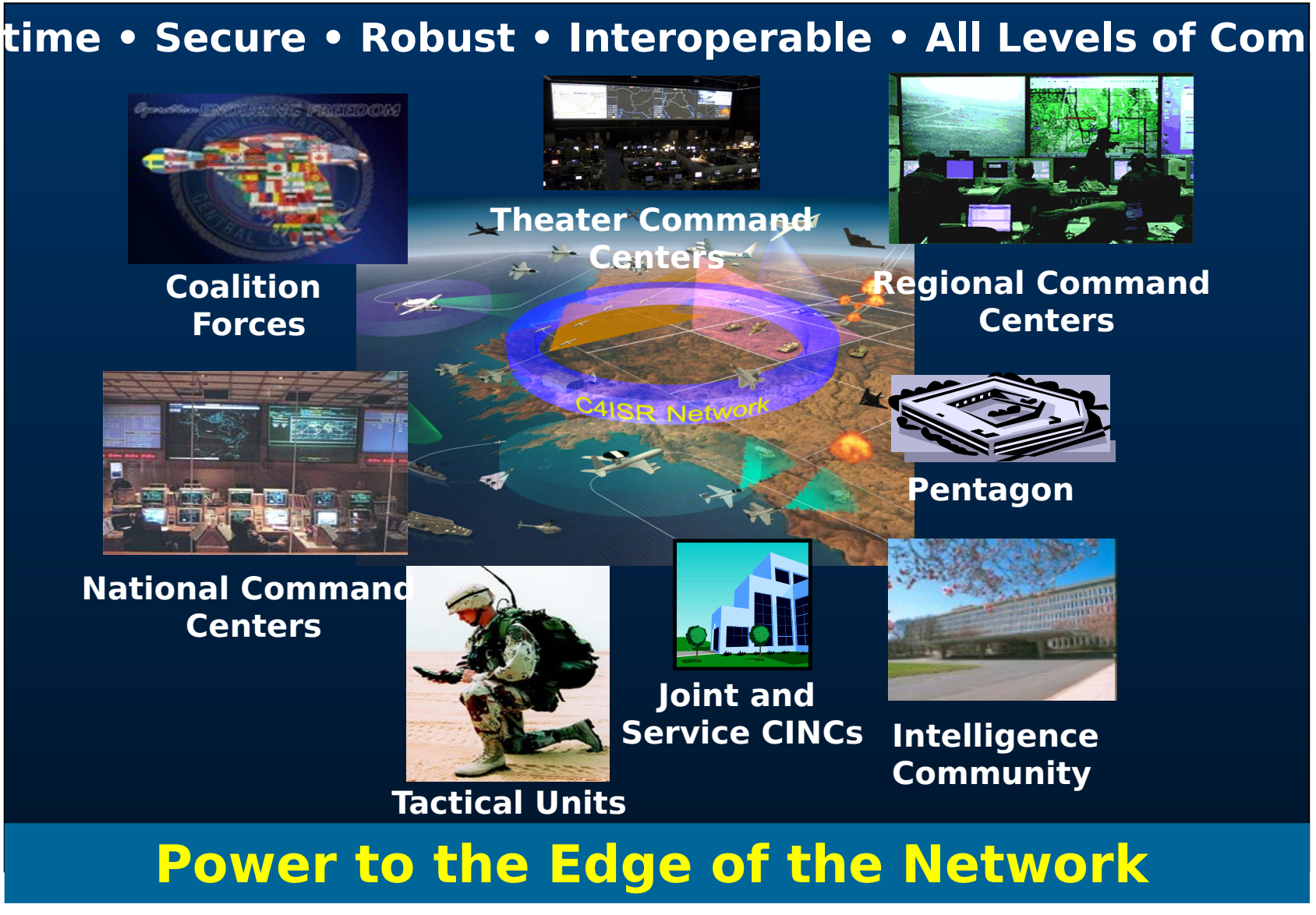

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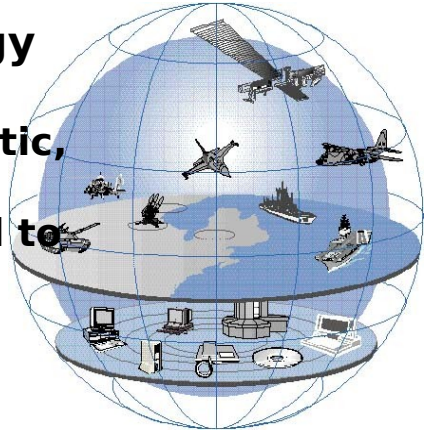
Key Elements of Network-Centric Warfare

- **Network centric warfare will maximize our ability to project power**
  - **Much more than just integrating IT into current warfighting strategies**
  - **Requires development of new concepts and capabilities**
  - **Seamless integration of network centric philosophy with warfare**
- **Network centric –Shifts focus from system and platform emphasis to network emphasis**
  - **Strategies emphasize dynamic relationships among actors and not just the actors themselves**
  - **Ability to communicate globally, securely, and quickly**
- **Warfare-Planning must relate to an effects-based strategy of warfare**
  - **Must address integration of military, intelligence, diplomatic, coalition capabilities at levels from global to tactical**
  - **Requires ability to develop a single integrated picture and to generate adaptive “speed of command”**



If the Net-Centric Concept is to become real …

- **Critical Needs have to be met:**
  - **Exploit "exploding" data, information, into knowledge**
  - **Collaborate/horizontally integrate**
  - **Be reliable and secure**
  - **Be mobile**
  - **Be geospatially transparent**
  - **Be timely**
  - **Be easy**
- **Challenge: To create National Security Networks and Weapons Systems that:**
  - **Meet the critical needs,**
  - **Are flexible as to participants**
  - **Are configurable and composable as to mission scope and scale**
  - **Are affordable as to cost and operational impact**
  - **Represent low transition risk**

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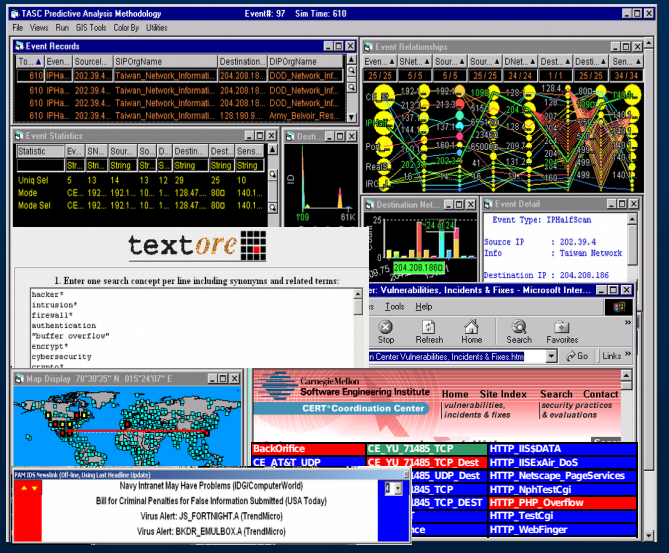
Key Technology Developments Enabling Network-Centric Warfare

- **Sensors**
  - **Electromagnetic, acoustic, imaging, human, …**
  - **Space, UAV, local platforms**
  - **Wide area to point observations**
  - **Macro to nano-technologies**
- **Information processing**
  - **Massive real-time database integration**
  - **Software development processes and technology platforms**
  - **Visual and interactive analysis**
  - **Interface, display, reporting technologies**
- **Communications and Networks**
  - **“On the move”**
  - **Global, all weather**
  - **Urban, desert, jungle, polar, …**
- **Precision weapons**
  - **Air, sea, ground**
  - **Reduced costs through improved technology in manufacturing and procurement**



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Network-Centric Warfare Balance between “Network-Centric” and “Warfare”

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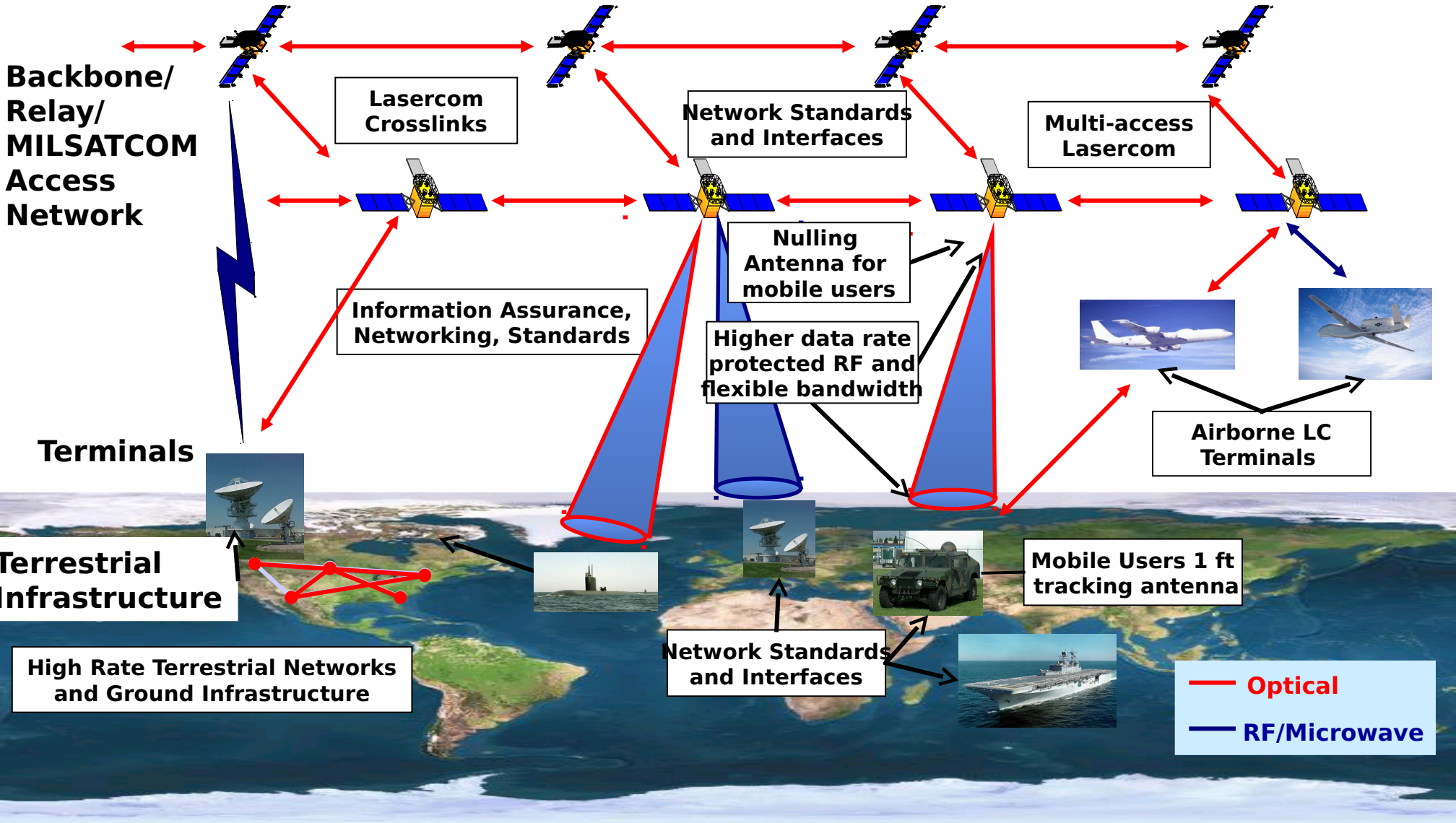
Transformational Communications is Critical to Network-Centric Warfare



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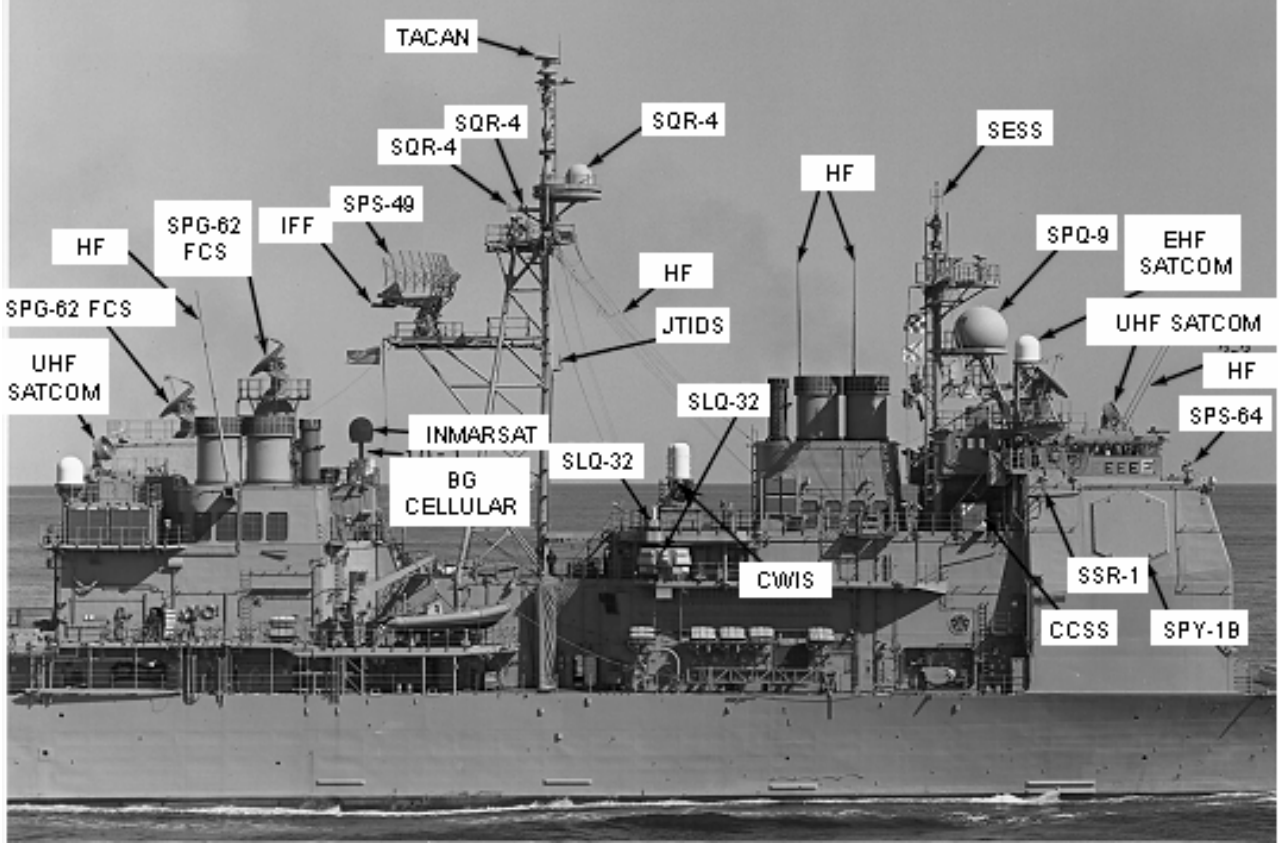
Enabling NCW Will Require Migrating Many Legacy Systems Under Operational Constraints



Technical Issues

- Top-side real estate
- Bandwidth limitations
- Electromagnetic Interference
- Lack of standards and legacy system interoperability

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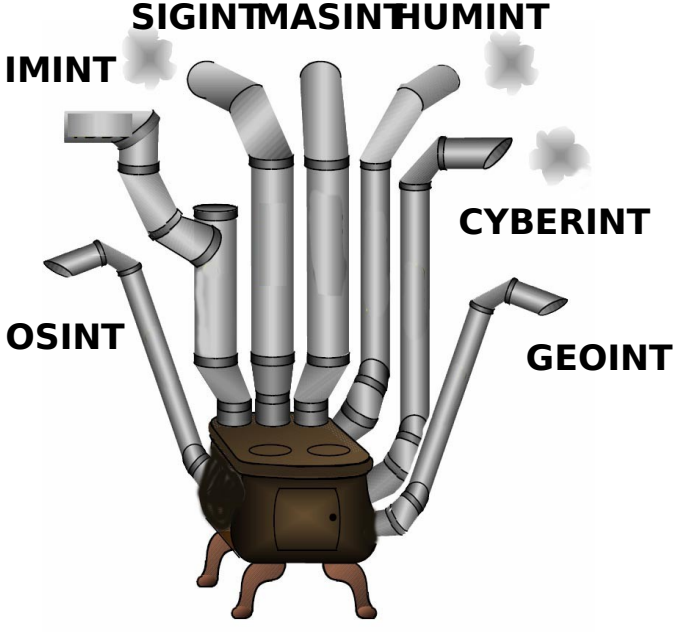
Moving from Stovepiped Systems and Platforms to Network-Centric Capabilities

System and Platform-Centric

Current National and Tactical Syster

- **Massive and growing volumes of data**
- **Largely independent collection, analysis, and reporting systems**
- **Leads to limitations in completene of analysis and timeliness of reporting**



Information Assurance – availability, integrity, confidentiality

Network-Centric

Capabilities
Integrated Intelligence, Composable Combat Systems,
Blue Force Tracking, Time-Critical Targeting, Battlefield Replenishment, Electronic Acquisition

Applications and Operational Systems
Intelligence Systems. Combat Systems, Business ystems, Medical and HR Systems, Logistics System

nformation Processing & Enterprise Services
Messaging, Storage, Mediation, Collaboration, Search, Discovery, Analysis, Reporting

Communications & Networking
TCS, GIG-BE, JTRS, Crypto-Modernization
Optical/RF/Wireless, Protocols

Data Collection
Image, Signals, Radar, Acoustics, Text, Multimedia, Communications, Human

Foundation
overnance, Doctrine, Policy, Architecture, Standards
Science, Engineering, Technology, Spectrum

Integrated Data Management – metadata, interoperability

Performance Targets & Barriers

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Need	Targets	Barriers	
		Social	Technical
Exponentiate Knowledge	Systems that auto-improve knowledge quality	Data and Information "ownership" paradigms, stove pipes, need to know security policies	Underlying science and math; uncertainty science
Collaborate / Horizontally Integrate	Systems that self-integrate, synchronize, and heal – ad-hoc	Stovepipe; security management paradigms	Legacy systems persistence; middleware; spectrum management; crude tools and applications
Be Secure	Everything Secure, but security not an operational impediment	No standard solutions among user community No standard Industry solution Increased Security implies less Operational utility	Low overhead data encryption; encrypted applications; relational classification
Be Mobile	Physical location decoupled from organizational location	Security/Privacy concerns	Form Factors, Power supplies, Spectrum, Integration
Be Geospatially Transparent	Physical location as well understood on the move as at home	No standard DoD or Industry solution; market chaos and churn	Tagging; data overhead; layer fusion
Be Timely	Systems that do not limit Customer timelines High levels of information synchronicity	Users continuously demand real time data – no consensus on what real time means	Underlying science and math; Uncertainty science; Correlation tools
Be Easy	Everything Human Centric	No standard Industry solution, Private experience driving customer professional expectations	Complexity is transferred to the infrastructure

Summary

- Network Centric Warfare (NCW) is essential to the success of future warfare
- NCW involves new concepts across the full spectrum of warfare
  - More than integrating IT into current strategies
  - New IT, new weapons systems, new warfighting concepts, new capabilities
- Network Centric Warfare is complex and controversial
  - Major paradigm shift must continue to occur
  - Legacy systems impacts
  - Competition for resources
- Technology that exists today supports Network Centric Warfare
- NCW concepts and implementations are beginning to show military value
  - Initial successes during OEF and OIF
- “Joint”acquisition strategies and programs will be key to NCW success
  - Many key acquisition programs directly involved in building NCW capabilities
  - Major impacts on many other acquisition programs

Network Centric Warfare
"Equipping the man – not manning the equipment"

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